

What is claimed is:

1. A switching mechanism of a lens barrel for switching between an automatic focusing mode and a manual focusing mode, said switching mechanism comprising:

5 a stationary barrel having at least one stop groove;

a lens holding ring, positioned concentrically with said stationary barrel, said lens holding ring holding at least one lens group;

a distance adjustment ring which is positioned  
10 concentrically with said stationary barrel, immovable along an optical axis relative to said stationary barrel, and rotatable about said optical axis relative to said stationary barrel, wherein a rotation of said distance adjustment ring causes said lens holding ring to move  
15 along said optical axis, and wherein said distance adjustment ring includes at least one engaging groove;

an AF/MF switching ring which is positioned concentrically with said stationary barrel, movable along said optical axis relative to said stationary barrel,  
20 and rotatable about said optical axis relative to said stationary barrel, wherein movement of said AF/MF switching ring relative to said stationary barrel between an AF position and an MF position switches between said automatic focusing mode and said manual focusing mode,  
25 respectively; and

an engaging member provided on said AF/MF switching ring, said engaging member being selectively engaged with said stop groove and said engaging groove,

wherein said AF/MF switching ring is prevented from  
5 rotating relative to said stationary barrel by engagement of said engaging member with said stop groove while a driving force is transferred from a power source to said distance adjustment ring to move said lens holding ring along said optical axis when said AF/MF switching ring  
10 is in said AF position, and

wherein a rotation of said AF/MF switching ring is transferred to said distance adjustment ring to move said lens holding ring along said optical axis via engagement of said engaging member with said engaging groove while  
15 said driving force is prevented from being transferred from said power source to said distance adjustment ring when said AF/MF switching ring is in said MF position.

2. The switching mechanism according to claim 1, wherein said engaging member comprises:

20 a first engaging portion and a second engaging portion which are fixed at opposite ends of a leaf spring in said optical axis direction to be engageable with said stop groove and said engaging groove, respectively, said leaf spring being elongated in said optical axis direction  
25 and a central portion thereof being fixed to said AF/MF

switching ring,

wherein said leaf spring is resiliently deformed to move said first engaging portion to a non-engaging position thereof, wherein said first engaging portion is  
5 disengaged from said stop groove, when said AF/MF switching ring moves from said MF position to said AF position in the case where said first engaging portion is not aligned with said stop groove in the circumferential direction thereof, and

10 wherein said leaf spring is resiliently deformed to move said second engaging portion to a non-engaging position thereof wherein said second engaging portion is disengaged from said engaging groove when said AF/MF switching ring moves from said AF position to said MF  
15 position in the case where said second engaging portion is not aligned with said engaging groove in said circumferential direction.

3. A switching mechanism of a lens barrel for switching between an automatic focusing mode and a manual  
20 focusing mode, said switching mechanism comprising:

a stationary barrel having at least one stop groove;

a lens holding ring holding at least one lens group which functions as a focusing lens, said lens holding ring being movable in an optical axis direction;

25 a distance adjustment ring being relatively

rotatable with respect to said stationary barrel so that  
a rotation of said distance adjustment ring causes said  
lens holding ring to move along the optical axis, said  
distance adjustment ring being provided with at least one  
5 engaging groove;

an AF/MF switching ring being movable between an AF  
position and an MF position along said optical axis and  
rotatable relative to said stationary barrel;

an AF driving power mechanism which rotates the  
10 distance adjustment ring when the AF/MF switching ring  
is positioned at the AF position in accordance with object  
distance information; and

a first engaging portion and a second engaging  
portion which are fixed at opposite ends of a leaf spring  
15 in said optical axis direction to be engageable with said  
stop groove and said engaging groove, respectively, said  
leaf spring being elongated in said optical axis direction  
and a central portion thereof being fixed to said AF/MF  
switching ring,

20 wherein said leaf spring is resiliently deformed to  
move said first engaging portion to a non-engaging  
position thereof, wherein said first engaging portion is  
disengaged from said stop groove, when said AF/MF  
switching ring moves from said MF position to said AF  
25 position in the case where said first engaging portion

is not aligned with said stop groove in the circumferential direction thereof, and

wherein said leaf spring is resiliently deformed to move said second engaging portion to a non-engaging position thereof wherein said second engaging portion is disengaged from said engaging groove when said AF/MF switching ring moves from said AF position to said MF position in the case where said second engaging portion is not aligned with said engaging groove in said circumferential direction.

4. The switching mechanism according to claim 1, wherein said stop groove of said stationary barrel comprises a plurality of stop grooves arranged in a circumferential direction of said stationary barrel.

5. The switching mechanism according to claim 1, wherein said engaging groove of said distance adjustment ring comprises a plurality of stop grooves arranged in a circumferential direction of said stationary barrel.

6. The switching mechanism according to claim 4, wherein said plurality of stop grooves are arranged at equi-angular intervals.

7. The switching mechanism according to claim 5, wherein said plurality of engaging grooves are arranged at equi-angular intervals.

8. The switching mechanism according to claim 1,

wherein said AF/MF switching ring is fitted on said stationary barrel to be manually moved between said AF position and said MF position, and

wherein said AF/MF switching ring includes a recess  
5 on an inner peripheral surface thereof, said engaging member being positioned in said recess.

9. The switching mechanism according to claim 2, wherein said leaf spring is resiliently deformed so that said first engaging portion moves radially outwards when  
10 said AF/MF switching ring moves from said MF position to said AF position in the case where said first engaging portion is not aligned with said stop groove in said circumferential direction, and

wherein said leaf spring is resiliently deformed so  
15 that said second engaging portion moves radially outwards when said AF/MF switching ring moves from said AF position to said MF position if said second engaging portion is not aligned with said engaging groove in said circumferential direction.

20 10. A switching mechanism of a lens barrel for switching between an automatic focusing mode and a manual focusing mode, said switching mechanism comprising:

a stationary ring having a first plurality of engaging grooves arranged at equi-angular intervals  
25 about an optical axis;

an AF/MF switching ring fitted on said stationary ring to be manually movable along said optical axis relative to said stationary ring between an AF position and an MF position to switch between said automatic  
5 focusing mode and said manual focusing mode, respectively;

a rotatable ring fitted in said stationary ring to be rotatable about said optical axis without moving along said optical axis relative to said stationary ring, said  
10 rotatable ring having a second plurality of engaging grooves arranged at equi-angular intervals about an optical axis; and

an engaging member fixed to opposite ends of a leaf spring in the optical axis direction, said leaf spring  
15 fixed to said AF/MF switching ring, wherein said engaging member includes a first engaging portion and a second engaging portion which are engageable in any one of said first plurality of engaging grooves and any one of said second plurality of engaging grooves, respectively,

20 wherein said first engaging portion of said engaging member is engaged in one of said first plurality of engaging grooves when said AF/MF switching ring moves from said MF position to said AF position in the case where said first engaging portion is aligned with said one first  
25 engaging groove in the circumferential direction

thereof,

wherein said second engaging portion of said engaging member is engaged in one of said second plurality of engaging grooves when said AF/MF switching ring moves from said AF position to said MF position in the case where said second engaging portion is aligned with said one second engaging groove in the circumferential direction thereof, and

wherein said leaf spring is resiliently deformed so that said first engaging portion moves radially outwards when said AF/MF switching ring moves from said MF position to said AF position in the case where said first engaging portion is not aligned with said one first engaging groove in the circumferential direction, and so that said second engaging portion moves radially outwards when said AF/MF switching ring moves from said AF position to said MF position in the case where said second engaging portion is not aligned with said one second engaging groove in said circumferential direction thereof.

11. The switching mechanism according to claim 10, wherein said rotatable ring is driven to rotate by an AF motor provided in a camera body to which said lens barrel is mounted when said AF/MF switching ring is in said AF position, and

wherein a focusing lens group moves along said



optical axis by a rotation of said AF/MF switching ring via said rotatable ring when said AF/MF switching ring is in said MF position.